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The Sugar Experiment Stations Acts Amendment Act of 1951

On March 30th, 1951, Royal assent was given to a Bill which amended "The Sugar Experiment Stations Acts, 1900-1948." This amending legislation was drafted for the express purpose of meeting the wishes of the industry in relation to the administration of the Bureau.

For a considerable number of years leaders of both the growing and milling interests in the industry had approached the Government on many occasions with a view to obtaining a greater measure of control in Bureau affairs. They had argued—prior to 1933—that the industry provided half of the finance required for the operations of the Bureau but that they had no say in how such money should be spent or in the planning of research and investigation. These approaches were met, in part, in 1933 when the then Minister for Agriculture and Stock (the Hon. F. W. Bulcock) proposed the creation of the Sugar Experiment Stations Advisory Board which consisted of six members. The Government was represented on the Board by the Minister and the Director, the Queensland Cane Growers' Council nominated two representatives, while the Australian Sugar Producers' Association and the Queensland Society of Sugar Cane Technologists nominated one each.

Legislation was enacted to establish this Advisory Board and it has continued to function since that year. Well known sugar personalities who have served terms as industry members on the Board include Messrs. J. W. Inverarity, J. C. Collier, B. Courtice, V. Thorp, W. D. Davies, W. Poustie, L. G. Scotney, as well as two members now deceased, Messrs. W. F. Seymour Howe and J. Smith.

Simultaneously with the inauguration of the Advisory Board the Government limited its subsidy, which had previously been on a £ for £ basis, to a maximum of £7,000 in any one year. The industry, however, continued its agitation for a greater degree of control since it felt that its representatives on the Advisory Board possessed advisory powers only. During the seventeen years of the Board's existence considerable progress was made in all phases of Bureau research and the benefits accruing to the industry have been almost incalculable. To mention but a few of the advances made which have had a profound effect on industry economy, such matters as disease and pest control, varietal improvement and improved fertilizer usage may be mentioned.

During the period since 1933 the Advisory Board was responsible for the formulation of legislation which ultimately resulted in the complete eradication of the serious gumming and downy mildew diseases as well as the reduction of the incidence of Fiji disease to a relatively small area. The establishment of Cane Pest and Disease Control Boards throughout the State with powers to collect and expend their own funds on disease and pest control was a major step in cleaning up certain diseases in the Cairns, Burdekin, Mackay, Bundaberg, Isis and Maryborough districts.

The Bureau's investigational work with "Gammexane" (benzene hexachloride) on the control of the cane grub and the wireworm has been one of the most spectacular advances the industry has witnessed, and the financial savings to the growers and the direct advantages to the millers are far greater than generally realised. These two pests had caused incalculable losses from Mackay to Mossman for decades, but to-day growers can plant their crops with complete confidence in the efficacy of the insecticide and at a very low cost.

The Advisory Board also supported the vigorous varietal improvement campaign instituted over 20 years ago, the results of which are self evident in the improved production per acre in recent years. The Bureau's own cane breeding has been responsible for the production of Q.28, Q.42, Q.44, Q.47, Q.49, Q.50 and others, while its import policy has resulted in C.P.29/116, P.O.J.2878 and Co.290 becoming major canes in our industry.

The Board has approved the policy of sending staff officers overseas for experience and has believed that the expenditure involved would ultimately be more than repaid in the knowledge gained for Queensland and in the more effective training of the officers concerned. During the period of the Board's existence the new Mackay Station was developed, Meringa Station expanded to its present size, the Lower Burdekin Station established and two seedling sub-stations and a disease resistance sub-station inaugurated.

The amending Act of 1951 will mean the abolition of the Advisory Board and the beginning of a new regime, but the Advisory Board will leave behind it a record of achievement and progress in all phases of cane production and raw sugar manufacture.

Under the amending Act a new body will come into being on July 1st, 1951, and will be known as the Sugar Experiment Stations Board. This Board will consist of two Government representatives in the persons of the Minister and the Under Secretary for Agriculture and Stock as well as two industry representatives who shall be nominated respectively by the two industry organisations. This change was brought about by the continued representations of the industry leaders to the Government for a greater measure of control in Bureau administration. The new Board will be completely autonomous and will possess power, among other things, to fix all salaries and conditions of staff employed in the Bureau of Sugar Experiment Stations. The Board will take over all property previously administered by the Bureau as well as the balance of the Sugar Fund.

This change has been welcomed by all sections of the industry, the general feeling being that the Government has appreciated the work previously done and is confident that, under the new control, industry research will be well looked after. The Government subsidy to a maximum of £7,000 per annum, will continue.

The transfer to a new administration will not, in any way, alter the services now being rendered by the Bureau to the growers and millers. The increasing demands for new services and investigations will undoubtedly necessitate extra staff as time goes on and this, together with all round increasing costs, may mean higher annual expenditure. It is felt, however, that past performances and their contributions to industry economy have established Bureau-industry relationships on a firm foundation, and that both producers and manufacturers will continue to look upon levies for research as gilt edged investments.

Errata

VOL. XIV No. 4, p. 161
Column (2) read (g) for (f)
Insert (f):

(f) *Incorrect placement of fertilizer.*

Fertilizer mixtures contain materials injurious to the cane plant and if they come into *direct* contact with the sett for any period of time, damage to the more sensitive parts, such as the eyes and the developing young roots, is likely to occur. Care should be exercised in adjusting the fertilizer distribution on the planter and to ensure that the tynes are set correctly to obtain the most efficient distribution of fertilizer in the soil around the cane sett, without actually coming into contact with it.

Field Day at Bundaberg

The meeting in Bundaberg of the Queensland Society of Sugar Cane Technologists for the purpose of holding its eighteenth Conference, was considered a suitable occasion for the Sugar Experiment Station's annual Field Day. Arrangements were accordingly put in hand to invite growers to meet at the Experiment Station on April 2nd. The agricultural delegates to the Conference were thus afforded the opportunity to inspect the Station and to see its work at first hand, and although many of them had been visitors in previous years it was, for some, a new experience.

Before 10 a.m. canegrowers and other persons interested in the production side of sugar cane began to arrive, and before noon over 400 visitors were gathered on the Station. A warm, sunny day contributed to the convenience of the visitors as well as enhancing the appearance of the Station. Canegrowers were generous in their praise of the appearance of station crops, which compared more than favourably with those of other dry farms in the district.

Conforming with established practice, the visitors were taken on a tour of the Station in groups of a dozen or so, under the guidance of a member of the Bureau staff. Although such a tour is necessarily limited as to time, and it is accordingly impracticable to inspect every block, the route was selected so as to bring items of major interest before the attention of visitors.

A few flats of cane seedlings had been raised in the glasshouse to demonstrate the production of new varieties from cross pollinated seed, and visitors were also shown seedling canes in the field, nine months after they had been germinated from seed in the glasshouse. The blocks containing the progressive plantings of selected canes were examined and growers were able to appreciate the reduction in numbers which occurred from year to year, as the result of selection based on growth characteristics, ratooning ability, disease susceptibility, etc.

Some interest was shown in a new field experiment with benzene hexachloride designed to measure, firstly, the effect of this modern insecticide on minor soil pests and secondly, the effect of the material in interfering with the uptake of nutrients when applied as a mixture with the fertilizer. The long term trash trial also promoted some spirited discussion. The trial with a large number of standover-type canes attracted considerable comment and it is obvious that, despite recent years experience with one-year cropping, many growers retain a desire to return to standover crops so as to have cane of high sugar content for early cutting.

The major interest of the day, however, was concentrated on weed control with 2,4-D. The Experiment Station has now had several years experience with this form of weed and grass control, and visitors were able to examine several cane blocks which had been untouched by cultivation implements or hoes for two seasons with the exception of a ratooning grubber after each harvest. All weeds and grasses had been completely controlled by pre-emergence spraying combined with contact spraying, and no sign of any growth was apparent either in cane rows or interspaces. A demonstration was given with the Station's boom spray mounted on a Farmall A.V. tractor and growers were able to see details of the equipment and to obtain information on the quantities of spray material required. Costs were shown to be considerably lower than cultivation costs.

An excellent array of tractors and farm machinery was made available by local firms and the crowd around this section of the Station was sufficient proof of the interest displayed by visitors. It was noted that in addition to the large number of growers from close handy mill areas, there was a good representation from Gin Gin, Childers, Maryborough and Bauple, and even Nambour was represented.

Lunch was supplied to the visitors and this was followed by some short addresses to the assembled gathering by members of the Bureau staff. These addresses are given below. The speakers were introduced by Mr. L. G. Scotney, who, as a member of the Sugar Experiment Stations Advisory Board, deputised for the Hon. the Minister for Agriculture and Stock, Mr. H. H. Collins. At the conclusion of the addresses a vote of thanks was proposed by Mr. R. C. Gibson and was seconded by Mr. F. Courtice, Chairman of the Cane Pest and Disease Control Board.

THE RESULTS OF TECHNICAL ADVANCES IN THE BUNDABERG SUGAR INDUSTRY

By NORMAN J. KING

The meeting in Bundaberg during the current week of the Queensland Sugar Technologists gives the growers of this area reason to consider the contributions made by science to improving cane production. We are apt to accept the changing order of varieties, weed control, pest and disease eradication, etc., as a natural evolution within the industry rather than the result of planned research.

During the past 20 years or so the entire production picture in South Queensland has changed almost unbelievably. From being the tag-end of the Queensland industry it has climbed almost dramatically to such a production peak that it frequently ranks second only to the irrigated Burdekin in production per acre.

To arrive at some comparative figures on production an examination has been made of the Bundaberg-Isis figures for the four years 1928-1931 and for the last four seasons 1947-1950. The earlier four years were selected because they were the last of the period prior to major changes in varieties and disease control and also because they were four record years in Queensland cane production up to that time. The four years just past also included three record years as well as one below average season. Between those two periods which are some 20 years apart there was no excessive alteration in the acreage harvested annually—the increase being of the nature of 20 per cent. But the following figures illustrate the great advances in production of total cane and sugar as well as the increases in amounts produced per acre.

Period	Average tonnage of cane	Average tonnage of sugar	Average tons cane per acre	Average tons sugar per acre
1928-31	389,326	48,613	13.47	1.75
1947-50	833,951	103,248	25.60	3.17

What are the major reasons for these changes? In the earlier 1928-1931 period this district was almost threatened with extinction as an important sugar district by the ravages of gumming disease. Two of the major varieties D.1135 and M.1900 Seedling were highly susceptible to the disease and manufacturing difficulties in the mills as well as severe losses in the fields caused serious concern to both sides of the industry. The other major variety Q.813, although resistant to gumming lacked vigour and failed to fill the gap as a general purpose cane. The early thirties witnessed the first planned attack on this disease and very soon the imported P.O.J. and Co. canes which were resistant to gumming replaced the old varieties, thereby not only eliminating a major disease, but conferring a new status of productivity on South Queensland soils. Since that time the district has not looked back but despite the major advance made it was soon apparent that complacency could play no part in the technical side of the industry.

The P.O.J. canes displayed an alarming susceptibility to downy mildew and Fiji diseases and Co.290 to red rot. Once again the search began for replacement varieties with the desirable disease resistance and with, if possible, enhanced yielding capacity. Successively we have tested and released Q.25, Q.42, Q.47, Q.48, Q.49, Q.50, Q.51 and Q.55 from our own breeding and C.P.29/116 from our import programme. All had the desired resistance to one or both diseases and some have played an important part in district economy.

During the same period our understanding of the requirements of district soils has advanced from a very sketchy knowledge to a complete and detailed picture of soil types and nutrient deficiencies. The part played by more intelligent fertilizing over the 20 years period in increasing production per acre has been an important one and the potentialities for further increase are by no means fully exploited.

It is difficult to assess with any degree of accuracy the gains which are made as a result of disease control because most of our disease eradication has been associated with a simultaneous change in varieties. But local growers will recall clearly the effect which downy mildew had on their crops in the plague years of the late thirties. The major gain, however, in eradicating a disease is that susceptible varieties can be grown and our release of highly productive canes is not hampered by the presence of a menacing disease.

Weed control may not normally be considered as a factor contributing to increased production, but the number of crop failures in Queensland this year caused by inability to

contend with weeds and grass in a prolonged wet season demonstrates its importance. Chemical weed control is a major advance in our agricultural economy and even if a plentiful labour supply were available the advantages of this modern tool would ensure its place in the future. There is a natural leaning on the part of the experienced farmer towards the proven mechanical methods of weed eradication, and a suspicion this his soil might suffer through lack of working and through the effects of chemical applications. However. we might remind ourselves that similar suspicions existed when tractors replaced horses and

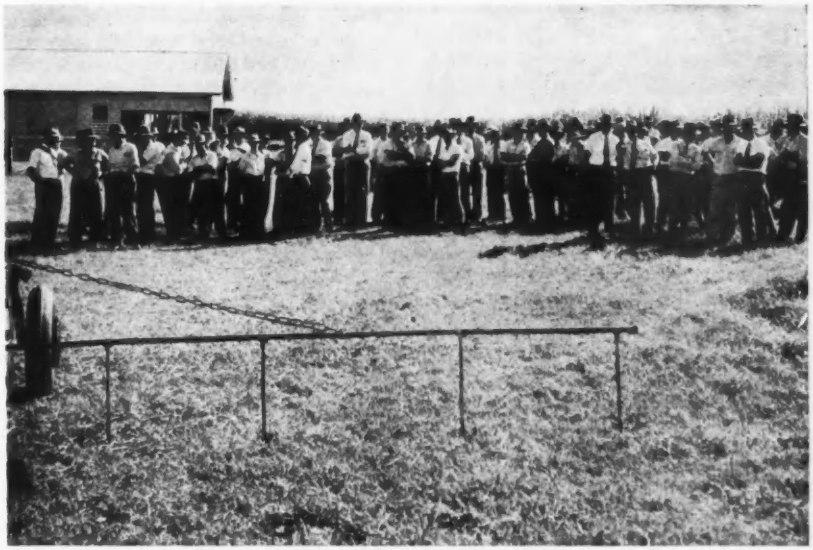


Fig. 1—Visiting growers watching a demonstration with the boom spray for weed control.

when pneumatic tyres first began to appear in our fields. Soils vary in their need for frequent cultivation and it is freely admitted that chemical control of weeds will not replace cultivation on certain untractable and hard-setting soils. The bulk of Bundaberg soils, however, are of such physical condition that chemical weed control is practicable. Insofar as the effects of the chemicals on the soils are concerned the amounts per acre are so small that no damage could result even if the substances were of a particularly harmful nature —which they are not.

Achievements in agriculture are never a reason for complacency since the ever changing picture presents new problems and demands constant effort and investigation even to maintain present standards. In what directions might future advances lie? There is always the possibility, of course, of further improvement in the varietal field, but as higher standards of production are achieved the chances of spectacular advances become less. There is frequently a lag between the acquirement of technical knowledge and its application by the grower. This may to some extent be the fault of the extension service since it is impracticable to maintain personal contact with every farmer, but the more important reason is the failure of many cane producers to take full advantage of the services and advice offering. Much can still be done to improve production standards by more intelligent fertilizing. There is ample evidence of hit and miss fertilizing methods, the usage of cheaper fertilizers irrespective of their suitability for the soil, and the tendency to aim for quantity in production at the expense of quality. A more thoughtful approach to this problem will, in these days of rising costs, earn dividends, and will contribute to the increasing stability and importance of this district.

The address by the Assistant Director, Mr. L. G. Vallance, entitled "Pre-emergence and post-emergence control of weeds by chemical sprays" is printed elsewhere in this issue.

OPERATIONS AGAINST PESTS AND DISEASES IN SOUTH QUEENSLAND

By R. W. MUNGOMERY

No doubt most growers in South Queensland have heard of, even if they have not actually witnessed the wonderful results that have been achieved in the control of the greyback grub pest in North Queensland by the application of benzene hexachloride to fields subject to attack. This insecticide has so revolutionised the control of this pest that some of the previously devastated farms now rank amongst the best producers in this State.

Possibly we have been extremely fortunate that our most serious grub pest is much more susceptible to B.H.C. than are some of the other species of cane grubs. We are also fortunate inasmuch as the young grub tends to move upwards, downwards or sideways in the soil depending on the degree of moisture present. This habit makes it a good subject for control since sooner or later the young grub makes contact with the toxic layer of insecticide and dies.

Unfortunately, the same spectacular successes have not attended our efforts to control grubs in South Queensland. This should not be taken to imply that all the various methods and insecticides which we have tested for the control of these two-year cycle grubs have been abject failures, but rather that infestations have been so light or so patchy that many of our trials have either failed to become infested, or infestations have been confined to such comparatively small sections of these trials that we were not justified in drawing any conclusions from the results. However, a new ray of hope has come as a result of trials against frenchi grubs in North Queensland, and during the last year or so quite a fund of information has been amassed from trials set out expressly against this pest. Differences as much as 20 tons per acre in the first ratoon crop were secured in a well replicated trial by using the same method of application as for greyback grub control, i.e., 75 lb. of 20 per cent. B.H.C. dust per acre applied in the half-open furrow after the setts have germinated and the young stools have become well established. It seems evident that control in this instance was effected against the very young stages, and it is only logical that such a procedure should be followed if the best results are to be obtained with the minimum outlay of insecticide. If control is to be aimed against the larger third stage grubs, a much heavier dressing would be needed and the practice might then become uneconomic. This brings me to the crux of the question and I maintain that this insecticide should not be called upon to control large third stage grubs by the use of excessively large amounts, or in other words to make amends for the shortcomings of a poor system of agriculture which involves plough-outs and re-plants.

It may be known to you that we have consistently advocated that in preparing grubby blocks for planting, all ploughings should be carried out during the spring-summer period when all grubs that are near the surface are effectively destroyed. The newly planted field then commences with a comparatively clean slate and it can be kept in that condition by the use of moderate quantities of benzene hexachloride. For those growers at Elliott Heads, Mullett Creek and parts of the Gin Gin district whose farms in the past have been troubled by frenchi grubs, I would commend this practice. However, I would like to issue a warning against the practice of mixing heavy dressings of B.H.C. with fertilizer for grub control because we have some evidence that this mixture does not give the same fertilizer response as where the two are applied separately. A trial has recently been set out on this Experiment Station for the dual purpose of measuring the extent of this interference with the uptake of fertilizer, and also to ascertain whether benzene hexachloride effects any substantial control of the minor soil-frequenting pests.

From the disease angle the changing varietal position has resulted in the reappearance of mosaic disease in a number of the newer varieties, and Q.50, Trojan and Pindar will have to be watched closely for this disease.

In the Maryborough area, a recently-discovered outbreak of chlorotic streak disease will demand the strict use of only healthy plants from approved sources, and in order to guard against the further spread of this disease, growers should be particularly careful to observe the restrictions governing the transfer of plants from diseased blocks or over quarantine boundaries.

Despite these two threats there is considerable cause for satisfaction that Fiji disease has maintained a downward tendency in the Bundaberg area, and whereas nearly 400 stools were rogued during the 1949-50 season, only slightly more than 100 have so far been destroyed during the current season. In the past the Bingera area made the highest contribution to the number of diseased stools rogued, but this year the position has changed and the Qunaba area showed an upward tendency, now heading the list. The position therefore seems to be getting down to near the minimum that can be expected with existing methods of control. Because of the difficulties and hardships involved in harvesting some fields last season, a number of lightly-diseased blocks received permits either for standing-over or for a further year's ratooning. These permits were granted only to meet the adverse circumstances, but they undoubtedly were not in the best interests of disease control. As a result the position must soon be faced regarding the desirability of destroying all Fiji-diseased blocks and refusing further permits, for now the disease has reached such a low ebb, it must not be allowed to rear its ugly head again. If any grower has a genuine case of hardship following the destruction of his diseased cane in compliance with an inspector's order, ample machinery exists within the Sugar Experiment Stations Acts for reasonable compensation to be paid by the Cane Pest and Disease Control Board concerned, and I think all Boards would be wise in budgeting for such an eventuality.

Possibly the brightest story to tell from the disease side of the picture is the disappearance of downy mildew disease from the Bundaberg district and incidentally from all commercial plantings in Queensland. This is quite an accomplishment when in 1940 it was regarded as the most important sugar cane disease in Queensland. Its last stronghold was in the Woongarra where seven stools were destroyed early in 1950, but there has been no reappearance in the intervening 13 months despite the fact that weather conditions were favourable for its spread. Of course we realise the possible danger of re-infection from resting spores, but our experience gained from other districts indicates that this is unlikely, and with an alert and efficient team of inspectors there is little to fear. It certainly gives us grounds for optimism that we may now have one disease less to contend with in the future. May we soon attain the same objective in respect of Fiji disease! Less diseases mean fewer losses and less restrictions in the choice of suitable varieties, and this is already paying handsome dividends.

Pre-emergence and Post-emergence Control of Weeds by Chemical Sprays*

By L. G. VALLANCE

As early as 1915 the Bureau investigated the applicability of chemicals for the control of weeds on sugar cane farms. The materials used were arsenicals. Although these were shown to be effective weedicides there were many disadvantages associated with their general usage which, together with their cost, precluded them from being commonly adopted as part of normal farm management in sugar areas. Since satisfactory weed control is essential, particularly under tropical and sub-tropical conditions prevailing in cane districts efficient mechanical methods have been developed over the years. The rubber tyred, high clearance light tractor has proved a very valuable item of equipment on all but the smallest properties. With tine and disc equipment these machines may be used for the dual purpose of weed eradication and soil cultivation, both these objectives being frequently attained in the one operation. However, the increasingly serious difficulty of obtaining adequate farm labour, together with the steep rise in its cost, has aggravated the problem of maintaining efficient and economic weed control in most sugar districts.

The widespread use of phenoxyacetic acid and pentachlorphenol derivatives in other sugar countries prompted investigation into their possibilities for weed control in Queensland cane areas. Preliminary trials were commenced in 1948 and during 1949 and

* Paper presented at the Bundaberg Conference Q.S.S.C.T., March, 1951.

1950 the work was extended by the establishment of a large number of experimental and demonstrational plots on Bureau experiment stations and many farmers' properties throughout the cane growing districts.

Two main lines of investigation were pursued. In the first place, the work was designed to investigate the applicability of 2,4-D for pre-emergence control of weeds and grasses under the varying farm management requirements in the different areas. Secondly, a search was made for an efficient, economical contact spray for use when the pre-emergence effect of 2,4-D wore off and weed and grass seedlings began to make their appearance.

PRE-EMERGENCE CONTROL

Results were very quickly obtained which indicated the striking effectiveness of 2,4-D in preventing the development of weeds and grass seeds. In some cases the results were almost spectacular, for instance in a trial at Innisfail a single spraying gave complete control of weeds for a period of 21 weeks, from late September until February at which date the cane was out of hand. Other trials, both in North Queensland and in the southern districts, gave equally satisfactory results, although the duration of the period of pre-emergence control was not generally as extended as that mentioned above. Heavy wet season rain apparently did little to reduce the effectiveness of the spray, except where ponding occurred and pools of water covered the soil for some time. Effective weed control during the rainy season has always been a problem, particularly in North Queensland, and there is no doubt that 2,4-D will be extremely useful under such conditions. This has already been demonstrated in the Babinda-Innisfail areas during the high rainfall period that characterised the end of 1950 and the early part of 1951. In fact, in reviewing the many trials and demonstrations carried out over the past two years it cannot be denied that the results are most encouraging. A pleasing feature of the work to date is that no damage of any consequence to the germinating sett or young plant has been occasioned when the spray has been used according to directions and with reasonable precautions. A typical example of the control obtained is illustrated in Fig. 2.

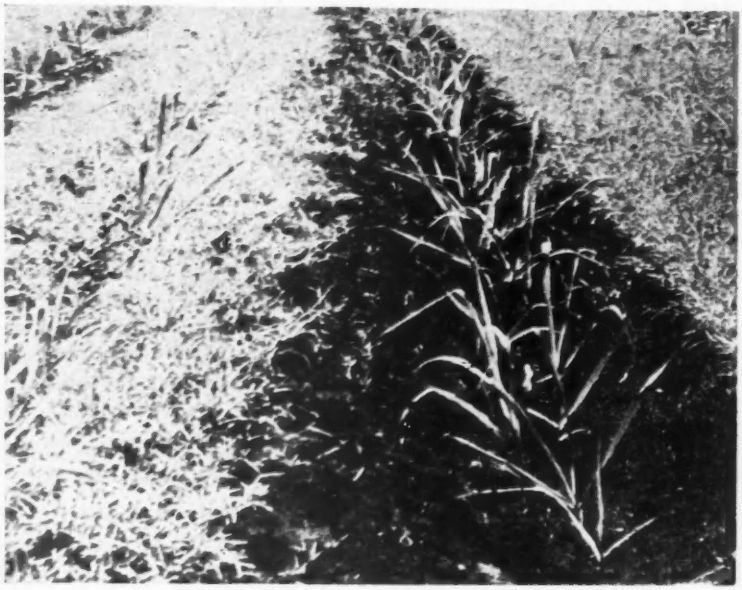


Fig. 2—Showing pre-emergence control of weeds at Meringa Experiment Station

This plot was put down on Meringa Sugar Experiment Station as a Field Day demonstration. The treated row on the right was sprayed with 2,4-D at the rate of 4 lb. per acre immediately after planting in April, 1950, and the photograph was taken the following July. On this same station efficient control of weeds and grasses was obtained on blocks of both plant and ratoon cane with one application of 2,4-D in September. The control persisted until January at which date the cane was out of hand.

At Bundaberg the 1949 and 1950 series of pre-emergence trials gave equally good results.

COMBINED PRE-EMERGENCE AND CONTACT SPRAYS

An initial difficulty in formulating a routine spraying programme to replace mechanical cultivation was the lack of a suitable contact spray to eradicate weeds and grasses which grew after the pre-emergence effort wore off. However, a series of investigations indicated that either a creosote or a mineral oil base spray containing sodium pentachlorphenate and also 2,4-D was quite effective providing the fresh growth was sprayed when very young. On Bundaberg Station weed control on several blocks was carried out entirely by chemical sprays during the spring and summer months 1950-51. The results were very satisfactory and there seems no reason why such methods should not become standard farm practice on areas of this type.

The results obtained and the methods used on the ratoon block B.3 may be quoted as a typical example. After harvesting, the interspaces were loosened with the grubber and the fertilizer applied on 5th October. Soil moisture was good and approximately five inches of rain fell on 8th and 9th October. On 10th October, 2,4-D was applied with the tractor boom spray at the rate of 4 lb. per acre dissolved in 40 gallons of water. A further five inches of rainfall fell between this date and about the end of the second week in November. The block was resprayed on 10th November with a combined pre-emergence-contact spray (creosote + pentachlorphenol + 2,4-D), since some germination was occurring. Previous experience had indicated the necessity for early application, such timing being a most important factor. Excellent control was obtained. The block remained free from weeds until 8th December when further germination was observed, and the block was immediately resprayed with the same materials. During the period between these two sprayings some seven inches of rain were recorded. Very heavy flood rains occurred in January but when last reported at the end of that month the block was still clean although a very light germination was commencing.

Full details of costs for weed eradication were kept on this area and also on an adjacent and similar block where normal scarifying and chipping methods were used. The cost of the chemical control methods was £5/9/4 per acre over the period 10th October to end of January as compared with £10/9/6 for the same period on the block where the usual methods were employed.

TIME OF APPLICATION OF SPRAY

Timing is an all important feature in the use of both the pre-emergence and contact spray. Because 2,4-D will not eradicate grasses once the seed has germinated and begun to grow it is very necessary that the initial spray for pre-emergence control should be applied to the soil when it is clean and free from growing weeds and grasses. Some recent trials in North Queensland were complete failures because of non-adherence to this important principle. Admittedly it is sometimes difficult to be sure that there are no seedlings present. In the instances referred to, the land had been worked at planting and was apparently clean but, owing to the very moist conditions, the seedlings were not killed but were transplanted. In such a case it would probably have been better to have used as a first application a combined contact plus pre-emergence spray. This procedure has distinct possibilities in many areas where weed seeds are germinating so rapidly that it is not practicable to apply the spray in time, particularly where large acreages are concerned.

An interesting trial at South Johnstone which gave very satisfactory results was carried out on a ratoon crop. The most satisfactory control was obtained by spraying the stool row almost immediately after the crop residues were raked and the soil disced and before the ratoons had commenced to

shoot; i.e., spraying was not delayed until all ratooning operations were completed. Grubbing and cutting away were carried out in due course after spraying by straddling the stool thus avoiding any interference with the pre-emergence film in the cane row itself. By applying the weedicide to the cane row only, the amount of chemicals used per acre was reduced by half and the subsequent working of the soil in the interspace was responsible for controlling weed growth in that area. Undoubtedly the method of confining mechanical cultivation to the inter-row and using the sprays on the cane row only has distinct possibilities, and growers should be persuaded to give this procedure a trial on both plant and ratoon crops.

As was previously mentioned the contact sprays of either the diesel oil or creosote type do not give satisfactory control unless applied to the weed and grass seedlings in the very early stages of their growth. It is therefore essential to make these applications as soon as practicable after germination has commenced. If sufficient 2,4-D is included a pre-emergence control is also afforded in order to cope with the seeds which have not yet germinated.

RATES OF APPLICATION

A considerable amount of experience in all areas indicates that about 4 lb. of the water soluble sodium salt of 2,4-D (80 per cent. active ingredient) is a suitable rate of application per acre. Possibly this amount could be increased somewhat on the more heavily infested areas, but at present prices this application is very close to the upper economic limit. With a tractor boom spray good ground coverage may be obtained by using 20 — 40 gallons of water per acre in which is dissolved the required 4 lb. of 2,4-D.

The concentrations of the contact sprays which have been used varied somewhat, but a content of 70 — 80 per cent. creosote or mineral oil is generally satisfactory. This also contains pentachlorphenol, the percentage varying from 3 to approximately to 12 per cent. and the results indicate that the higher amounts are usually more effective. In addition the contact spray contains 3 to 5 per cent. of 2,4-D. For most purposes this mixture is used at the rate of 4 gallons per acre with satisfactory results and without damaging the cane plant. Higher rates will readily cause serious burns to young cane. The 4 gallons of contact spray is conveniently dissolved in 20 — 40 gallons of water for application with the boom spray. When a pre-emergence effect is required in addition to contact killing a further amount of 2,4-D is added to the solution in order to bring the amount of this material up to the necessary 4 lb. per acre.

SOME ADVERSE ASPECTS OF CHEMICAL WEEDICIDES

Notwithstanding the satisfactory results which have been obtained in the eradication of weeds and grasses by means of both pre-emergence and post-emergence spray applications there are several difficulties associated with their use which militate against their universal employment. Possibly the most unsatisfactory feature has been the comparatively high costs of the materials. Prices have not been sufficiently attractive for the grower to adopt these newer procedures, particularly when he has already at his service his familiar and time tested methods. In addition the expenditure of approximately £100 for the purchase of a power spray is a further deterrent. However, should the fall in price that has already occurred with the increased demand for 2,4-D continue, there will undoubtedly be stimulated a much wider interest. In fact, present reduced prices in conjunction with the high cost and scarcity of farm labour, have rather tended to swing the economic balance in favour of chemical control, as instanced by the figures previously quoted for Bundaberg Experiment Station.

Several failures have been encountered with pre-emergence applications on soils which have a tendency to crack. In such instances a prolific growth of weeds occurred from the sides of the cracks where no protective film of 2,4-D existed. These and other soils which require loosening by cultivation present a difficulty but this is most conveniently overcome by spraying the cane row only and cultivating the interspace.

Warfarin—A New Rat Poison

By R. W. MUNGOMERY

Widespread interest has lately been aroused by several news items in local papers and by an article in the April number of "The Reader's Digest" which refer to a new rat poison called "Warfarin," recently developed in America. This poison is claimed to revolutionize the whole system of baiting and poisoning rats, and like many others—particularly those that are non-toxic to humans—it appears to be coming in on a wave of popularity and publicity, but whether it will

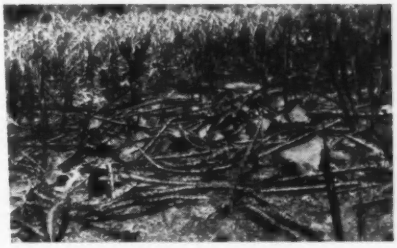


Fig. 3—Severe rat damage in Badila.

measure up to the rather high claims that have been made for it and retain its popularity, is a matter for some conjecture. Instead of causing the rats to die a painful or violent death as is the case with most rat poisons now on the market, this poison causes internal haemorrhage and it is stated that the rats die "slowly, gently and almost imperceptibly."

As might have been expected, canegrowers have been to the fore in making enquiries regarding the possibility of using this new poison in campaigns against canefield rats, for it is well known that these pests inflict considerable damage each year on cane crops in various parts of North Queensland, as well as being carriers of the dreaded Weil's Disease. The following details, therefore, have been compiled for the information of those growers who have been sufficiently interested in rat control to enquire whether this new poison is likely to have a place in the Queensland sugar industry.

Fig. 4—Illustrating the damage caused by rats in cane fields.

For some years past it has been known that a chemical called dicumarol is effective in slowing down the clotting of blood, and this compound has been used by surgeons in saving human lives by preventing blood clots after operations. However, this drug is rather dangerous to use since an overdose causes haemorrhage. In investigating this field, closely related compounds were developed and tested, and amongst them was Compound 42, which later received the name of "Warfarin." Because of the fact that this chemical could cause certain animals to bleed to death, the idea was conceived of exploiting this substance as a rat poison, since it has neither taste nor smell and therefore blends perfectly with corn meal or other favoured rat foods. Hence rats, unable to detect the poison and not being noticeably affected go on eating the contaminated food until their lungs slowly haemorrhage so extensively that they eventually die. Possibly the point of greatest appeal about this poison is the fact that it is virtually non-toxic to birds and human beings; indeed, one dose has little effect on a rat, and it is necessary for a rat to feed for about five consecutive nights before death ensues. Whilst this may be a more or less simple matter to achieve in the case of warehouse rats which are accustomed to visiting the same spots nightly for their food supply, it presents quite a different problem under canefield conditions where rats are free to wander from one block of cane to another, or into the surrounding waste lands in order to vary their food intake. Presupposing it were economically sound to provide a large number of feeding stations that were not readily accessible to other animals or birds, it would be difficult to ensure even with settled populations that rats would eat the bait on a number of successive nights. It is in this respect that it is considered "Warfarin" would manifest its weakness as a control agent for canefield rats. In the case of moving populations, it is inconceivable that the poison would be of any use whatsoever. Already reports coming to hand from British research institutions indicate that "Warfarin" is not producing the sensational results that have been claimed for it, and there appears to be little reason for undue enthusiasm. Moreover, coumarin derivatives previously tested here proved entirely worthless.

Investigations carried out on the rat problem in Queensland canefields indicate that the most effective means of killing rats is by the use of a highly toxic poison bait, and two of the poisons that have been found most successful to date are phosphorus and thallium sulphate. Cane Pest and Disease Control Boards therefore are urged to continue using these two poisons in preference to taking up a new poison which, from the outset, gives little promise of justifying its use under canefield conditions.

★

The Bureau Expedition to New Guinea

One of the most interesting finds to date by the 1951 New Guinea Expedition is the discovery of a giant variety of *Saccharum robustum* growing in the region of the Chimbu River in the Central Highlands of the Territory of New Guinea. Some sticks of this variety measured no less than $1\frac{3}{8}$ inches in diameter with internodes 18 inches in length. The foliage was also very broad for *robustum* reaching a width of $2\frac{3}{8}$ inches and a length of four feet.

In addition to its great size, this variety, which receives the number 51 N.G.91, has particular interest on account of its sugar content. Although the sticks are extremely hard and woody like those of other so-called "wild" sugar canes, juice which was extracted from a young stalk showed a brix of 13°. The brix readings for most varieties of *S. robustum* range from about 7° to a maximum of 10°.

No flowers have been found on 51 N.G.91 but it is stated by the natives that it flowers in some localities and accordingly it is likely that it will arrow in coastal North Queensland.

J.H.B.

Rolleston Cane Harvesting Machine

By C. G. STORY

The labour position with regard to cane cutting is becoming increasingly difficult and the harvesting of their crop is a problem which is considerably exercising the minds of Mackay growers. Admittedly, the Central area is not alone in this problem but when it is appreciated that it contains some 1,900 cane growers who are cultivating one-third of the total sugar cane area of the State, the seriousness of insufficient labour for harvesting is evident. This area extends from Kalarka in the south, to Proserpine in the north and westwards to Netherdale at the foot of the Eungella range, and many of these areas suffer from the disadvantage of not being close to the amenities of a large town. In such more or less isolated localities it is virtually impossible to obtain adequate labour.

The scarcity of labour for harvesting has placed a heavy burden on canegrowers and their families and any mechanical method of harvesting, which will solve wholly or in part the harvesting problem in scattered areas will be indeed welcome. The present trend of mechanical harvesting requires that it must be efficient, speedy and economical, while capital outlay for a machine must be such that it is not beyond the reach of the smaller grower.

There are a number of growers experimenting with cane cutting machines, and to date, four cane harvesting machines have been produced and demonstrated in Mackay districts. These are (a) the Moloney, which is used by a number of cane growers in the area, (b) the Kinnear which, in addition to cutting, also bundles (one of each of the above two machines has been sent overseas), (c) the Rasmussen, and (d) the recently developed Rolleston harvester. All of these machines do efficient work. The following article describes the machine recently demonstrated at Mackay, i.e., the Rolleston harvester.

The Rolleston Cane Harvesting Machine

The first machine developed in 1943 was attached to the side of a tractor, but it was not a success. The second machine was attached in front of the tractor. It was simple and worked efficiently under favourable conditions. However, it left the cut cane in long lines with the ends overlapped and not bundled, and moreover, it could not successfully handle crooked cane. In an endeavour to overcome this latter disadvantage the third and present machine described below was developed in 1950.

Description

This harvesting machine is mounted on, and in front of a Fordson tractor. A wide channel shaped frame is fitted over the tractor drawbar and two arms of plough beam steel extend underneath the tractor from this to the cutting blade in front of the tractor. These arms are pivoted both at the frame and at the rear of the blade. The pivoting at the drawbar allows the cutting device to remain level since if it were rigidly attached to the front axle, the rise and fall of ground would affect the setting of the machine. The pivoting at the rear of the blade is to allow for the setting of the angle of the blade.

Two short chains attached to the front wheel assembly on either side, prevent the arms side swaying, and these chains must be loose while the machine is in operation.

A topping lever is mounted on the right hand side of the channel shaped frame and attached to this is an upright arm which is drilled to allow for prior adjustment to the most suitable position, depending on the length of cane encountered. A broad plate behind the cutting edge, allows the blade to work on boggy land. To this broad plate a back plate 18 inches high is attached at right angles, the whole assembly giving the appearance from a distance of an angle dozer blade. (See Fig. 5). The weight of the blade holds it level without the assistance of springs. Two rounded steel stanchions with extended arms are attached to the back plate, and attached to these is a wooden push bar which forces standing cane to the left, just before it is cut. (See Fig. 6). To these stanchions and to the plates on the steel beams are attached the two threaded hinged bolts which are used in setting the angle of the blade to the ground. An adjustable steel skid is attached when cutting hilled up cane; it is claimed that this is

superior to a wheel as it pushes aside any obstructions, whereas a wheel would climb over them.

For parting the rows and handling lodged cane, an arms extends five feet beyond the leading edge of the cutting blade. This arm is connected to the pusher by a steel rod, the combined effect of which is to pick up the cane and move it to the left. In addition, pipe fenders fitted behind the blade and around the tractor, prevent leaning stalks from the adjoining row fouling the tractor.

There is a lifting device for carrying the cutting mechanism when not in operation; at present this is controlled by a lever, but it could be attached to a power lift on a tractor.

A light frame work suitably braced, with the main uprights attached to the front of the tractor, carries the topping device. The power for the cutting mechanism is provided by a belt drive from the tractor pulley to a pulley mounted on a shaft carried on these uprights. The raising and lowering of the topping level is independent of the shaft, and this may be carried out without interfering with the belt drive. A vee pulley and belt with a quarter turn drive two circular saws blades, mounted on the top and bottom of a housing, which contains the tapered roller bearings and the pulley of the topping mechanism. It is claimed that circular saws provide a topping system, which will not jar or jam irrespective of the load encountered.

Arms extending in front of this act as a guide for the tops which are cut by the saws and thrown against a guard on the right. This causes them to fall to the ground in a line over which the right hand wheel of the tractor passes.

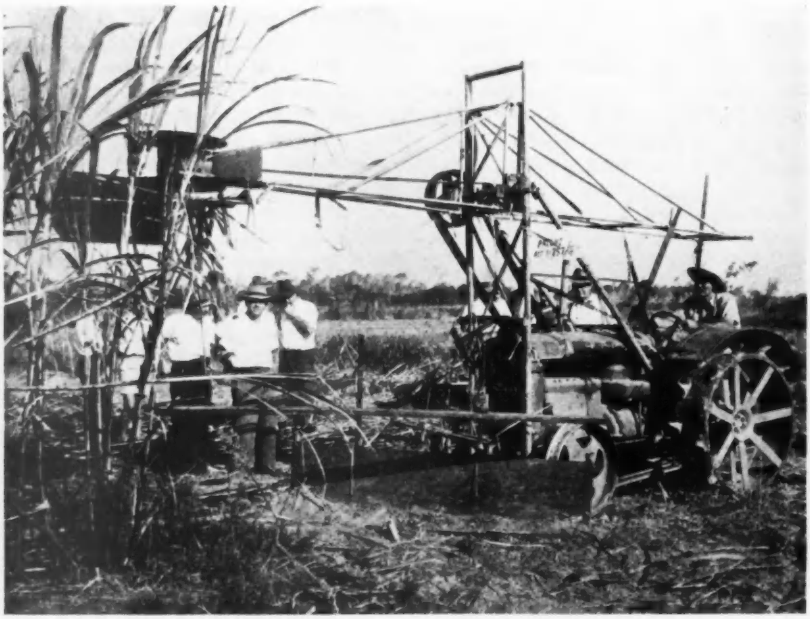


Fig. 5—A view of the Rolleston cane harvester.

Operation

The tops are removed by the circular saws, then the pusher presses the cane stalk to the left, and while the pressure is still on the cane stalk, it is severed at the butt by the ground cutting blade, following which the stalks fall into a horizontal position against the back plate. As the tractor is driven forward and the bundle accumulates, it moves to the left of the cutting device by virtue of its own weight aided by ground friction and the for-

ward thrust of the tractor. These bundles are left clear of the tractor at an angle of approximately 45 degrees. Normally, the cane is left in bundles of about 1 cwt. but occasionally smaller bundles occur. The height of cutting may be varied by the operator.

It is intended to attach a bundling rake to build bundles of up to 4 cwt. suitable for mechanical loading. Although it is not claimed that this machine is perfect, since there are

Fig. 6—The Rolleston harvester at work.

further improvements to be made, it has many good features, the main points of which are:

1. It has the ground cutting and topping mechanisms mounted in front of the tractor, thus doing away with side thrust. The bundles are delivered automatically on the left hand side and do not obstruct or interfere with the passage of the machine.

2. It is rarely necessary to cut breaks to allow the machine to operate; it will therefore cut out a row for a firebreak or cut down green cane with the trash on for plants. At a public demonstration in Mackay, the ability to start on any row was noticeable. It leaves a wide laneway between two adjacent rows if these are cut in opposite directions. This is convenient for loading on motor lorry, truck waggon or tramline.

3. Only one man is necessary for all operations.

4. Tests have shown the machine to work under wet conditions; for instance during the 1950 season, following the cyclonic winds and with subsequent bad harvesting conditions, Messrs. Rolleston Bros. harvested 700 tons out of 900 tons with their machine.

5. It is mobile, and could be fitted on almost any tractor. When travelling along roads all parts are clear of the ground.

6. It can be readily removed from, and attached to the tractor.

7. The usual cutting rate is at a speed of 3 to 5 miles per hour, and in 1950, it performed well in heavy crops.

8. There are few moving parts and the machine should not require heavy maintenance. The topping device is non-jamming and the blade does good ground cutting.

9. The price is expected to be reasonable and it is intended to make it within the means of the smaller grower.

To-day, when so many canegrowing operations are already mechanised, it is the opinion of many people in the sugar industry that mechanical harvesting must also be developed to further reduce the effect of labour shortages, and any machine produced which is reasonably efficient will take the industry one step further towards that goal. For mechanical harvesting to be completely successful the dual problem of cutting and loading must be solved. It is gratfying to note that these aspects are receiving close attention from farmers and agricultural engineers and it is to be hoped that eventually a satisfactory solution to these problems will be found as has been the case with many other difficulties which have confronted the canegrower in the past.

The Effect of Mixing Fertilizer with Benzene Hexachloride for Cane Grub Control

By G. WILSON

B.H.C., since its introduction as an insecticide for cane grub control in Queensland, has been used as 10 per cent. or 20 per cent. dust in which pyrophyllite and other inert materials have been used as diluents to a considerable extent. Rock phosphate has been widely used in recent formulations and this may yield some fertilizer benefit but the extent to which this type of phosphate becomes available on the diverse soil types encountered is not known and in any case the quantity involved represents only a portion of one of the three fertilizer elements commonly required.

Fig. 7—Persistence of B.H.C. into second ratoons. Cane on right untreated.

Transportation by sea and rail and handling added to the original cost at the source of supply of the diluent material (which forms 80 per cent. to 90 per cent. of the dust) creates a substantial portion of the cost of the insecticide when delivered to cane growers in Central or North Queensland. Farmers and their technical advisers were quick to envisage possible economies that might be effected by using normal fertilizer substances as the diluent. In addition to eliminating the cost of much otherwise useless material, such a procedure would also make possible the further economy of applying the insecticide and fertilizer in one field operation, with the added advantage that the 3 to 4 cwt. of fertilizer normally used would make the even distribution of the insecticide by ordinary fertilizer distributors a simple process.

The acute shortage of labour, especially of the experienced skilful class to which the field application of B.H.C. could be entrusted, has led cane growers to consider, and in several cases put into practice, the idea of mixing the 10 per cent. or 20 per cent. B.H.C. dusts with their fertilizer to achieve at least the economy of applying the materials in one field operation. In most cases the mixing has been done on the farm, often in a very haphazard manner, and it is extremely doubtful whether any real gain was achieved since time was spent mixing, and there is a probable loss of efficiency of the B.H.C. through uneven spread.

The Bureau of Sugar Experiment Stations has been keenly interested in possible improvements in the physical characteristics and economic aspects of the diluents used in B.H.C. dusts. However, the introduction of fertilizer bases in the dusts used in early experiments would have greatly complicated the already very large volume of work required to clarify in a relatively short space of time the main principles of grub control. It is obvious

* Presented to the 1951 Conference of Cane Pest & Disease Control Boards at Ingham.

that if regularly increasing doses of B.H.C. based on fertilizer were used in experiments, any resulting differences in yield could be due either to the additional fertilizer, to the B.H.C. or to both, and trials would have to be elaborated to separate these effects.

In 1948 an investigation was commenced on the effect of mixing 10 per cent. B.H.C. pyrophyilite dust with fertilizer. The applications were made in the drill at planting time. This method has since been adhered to in the use of B.H.C. fertilizer mixtures since early trials indicated that the grub control effected was quite satisfactory. Changes have been made in the adoption of 20 per cent B.H.C. dust as a standard and the inclusion of 50 per cent. and 100 per cent. forms of B.H.C. in the fertilizer mixtures in current trials. The experiments were commenced mainly as studies to improve the efficiency of grub control but developments have shown that the effect of the B.H.C. on the value of the fertilizer is an important consideration.

Experiments established in 1948 indicated that greyback grub control by B.H.C. mixed with fertilizer and applied in the drill at planting time is equal to that effected by the present conventional method of application in the half-open drill after the cane is established. In these trials no clear cut evidence of fertilizer response by the crop was obtained; therefore no information was gained on whether the cane had derived the same benefit from the fertilizer as it would had the latter been separated from the B.H.C.

Incidentally, one of these trials showed that when B.H.C. fertilizer mixture is applied in the bottom of the drill below the plant it is too deep for effective greyback control. Six tons of cane per acre was lost in the first ratoon crop when compared with placement above the plant. Grub damage in the plant crop in this instance was not great enough to bring about significant differences.

In 1949 a number of experiments were laid down in which applications up to 300 lb. of 10 per cent. B.H.C. per acre in the drill at planting time were compared with similar quantities applied later after the cane was established. These applications were not mixed with fertilizer, but they are of considerable interest inasmuch as the drill applications did no damage whatever to the cane; they were placed immediately above the plant but after sufficient soil had been filled into the drill to just conceal the plant and protect it from direct contact with the B.H.C. Special attention is drawn to this because some farmers mixed fertilizer and B.H.C. together and applied it by hand in the bottom of the open drill and placed the cane plants directly on it. This led to a germination failure and consequently farmers have been advised not to apply B.H.C. for grub control in the drill at planting time when other methods can achieve the desired result.

Fig. 8—Illustrating the critical dosage of B.H.C. Cane on right received 100 lb. per acre of 10 per cent. dust; that on left only 50 lb.

In 1950 further trials were started in which the B.H.C. and fertilizer were mixed and applied above the protected plant in the drill. Three forms of B.H.C. were used in the mixtures, namely 20 per cent. and 50 per cent. dusts and 100 per cent. B.H.C. in the shape of very minute pellets. These mixtures were all adjusted to contain the same amount of B.H.C. equivalent to 75 lb. of 20 per cent. dust per acre. These were compared with the same quantity of 20 per cent. dust applied after the cane was established, an equal amount of fertilizer having been applied at planting time in the same location above the plant as the B.H.C. mixtures. Provision was made also for measuring any increase in yield brought about by that quantity of fertilizer.

To appreciate the points studied in these trials it has to be clearly understood that the application of fertilizer to a cane crop does not result in every case in a measurable increase in yield. Fertilizer trials regularly produce a proportion of results in which there is no response to fertilizer. If it should prove that the field being experimented on failed to give a measurable "fertilizer response" in the

season of the trial it is impossible to find out in that particular experiment what effect the B.H.C. admixture had on the fertilizer. The results that will now be discussed are drawn from two trials that showed an obvious fertilizer response.

For the first few months of growth of the young plant cane in these trials the weather was relatively dry and growth slow. During

Fig. 9—Cane on left received 100 lb. per acre of 10 per cent. dust; cane on right untreated.

that time no fertilizer response could be observed, nor was there any difference in germination, growth or stooling brought about by the presence of the B.H.C.-fertilizer mixture in the drill. Good rains commenced in November, 1950, and growth was greatly accelerated. By mid-December the response in the plots dressed with fertilizer alone was obvious. In one of the trials it is estimated that the increase from fertilizer will be well over 10 tons per acre. In the other waterlogging of the small cane has reduced the average fertilizer response but it is quite marked on several of the plots and probably reaches seven tons per acre in individual plot comparisons.

Equally obvious is the fact that where the fertilizer was mixed with B.H.C. the cane has made relatively poor growth although better than where no fertilizer was applied. It is estimated that 50 per cent. of the benefit of the fertilizer has been lost. Growth and stooling have both suffered.

These trials are still in the plant crop stage and will not be harvested for several months. In an attempt to supply a factual record at the present time of the comparative growth of the cane under different treatments the Vegetative Index somewhat similar to that described by P. Halais at the 1950 Queensland Congress of the I.S.S.C.T. has been employed. This index is obtained by weighing 30 leaves of equal rank on the stalk from each plot when the cane is 5 to 7 months old.

The weight in grammes of 30 leaves, being the average of four replicates of each treatment, is set out in Table I. Ordinary fertilizer trials, however, rarely show the great discrepancy in stooling that is displayed in one of these two trials. It is considered by this author that the leaf weight may reflect the relative size of the individual stalks but cannot represent the great differences in yield that must arise from the number of stalks per acre. Therefore the stalks per acre have been counted and are set out separately in Table II. The relationship between the final yields in tons cane per acre and the above indices can only be a matter for speculation until the cane is weighed.

Further studies along similar lines to the foregoing but of a more comprehensive nature are being initiated to widen our knowledge of this phenomenon. *In the meantime, it is recommended that B.H.C. in the amounts required for grub control should not be mixed with fertilizer.* Separate applications to the field should be made in such a manner that fertilizer and B.H.C. will not be placed in exactly the same position in the soil. Retreatment of ratoons with B.H.C. buried alongside the stool by the same distributor as is used for fertilizer is a practical example which requires intelligent treatment in making the two applications at different levels or spacings. The procedure of applying all the B.H.C. in the half open drill in the plant crop to protect the ratoons suggests itself as a likely means of avoiding this problem.

The use of rock phosphate as a diluent for B.H.C. is still preferable to employing totally

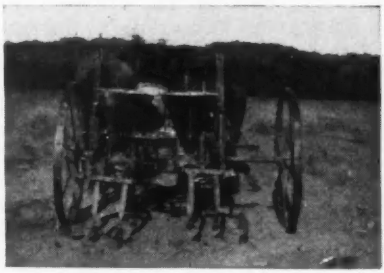


Fig. 10—Hoppers on a corn cultivator used for application of B.H.C.

inert materials. Separation of the B.H.C. from the rock phosphate will inevitably take place by chemical reaction of the rock phosphate with the soil over a long period of time. This may reasonably be expected to assist in maintaining soil phosphates on at least some soil types.

TABLE I.

Treatment	Trial A. Weight in gms. 30 leaves.	Trial B Weight in gms. 30 leaves.
F/20 A.P.	414	440
F/0	396	—
F/50 T.P.	366	403
F/100 T.P.	364	412
F/20 T.P.	350	408
0/20 A.P.	294	342

In Trial A, the treatments F/20 A.P., F/0 and F/50 T.P. significantly exceed 0/20 A.P. at the 1 per cent. level of significance, whilst F/100 T.P. and F/20 T.P. exceed 0/20 A.P. at the 5 per cent. level. In addition F/20 A.P. significantly exceeds F/20 T.P. at the 5 per cent. level.

Unfortunately it was not possible to adhere to the treatments originally proposed for trial B because the grower inadvertently applied a dressing of B.H.C. over the whole trial at the time when he was treating the remainder of the block. In addition, soil variations caused by waterlogging prevented the above figures from having any statistical significance, but their similarity to those of trial A is evident.

TABLE II.

Treatment	Cane stalks per acre.
F/20 A.P.	17,800
F/0	17,200
F/20 T.P.	12,900
F/50 T.P.	12,800
F/100 T.P.	12,700
0/20 A.P.	9,050

NOTATION

F/100=4 cwt. fertilizer plus 15 lb. 100 per cent. B.H.C. per acre.

F/50=4 cwt. fertilizer plus 30 lb. 50 per cent. B.H.C. per acre.

F/20=4 cwt. fertilizer plus 75 lb. 20 per cent. B.H.C. per acre.

F/0=4 cwt. fertilizer, no B.H.C.

0/20 = No fertilizer, 75 lb. 20 per cent. B.H.C. per acre.

T.P.=B.H.C. applied mixed with fertilizer at time of planting.

A.P.=B.H.C. applied separately after planting.

Beetle Emergence in the Highleigh District

Last season's emergence and flight of greyback beetles in the Highleigh area near Cairns is regarded as being one of the heaviest on record, and some idea of the density of the beetles on the feeding trees can be gauged by the accompanying photograph which shows a large weeping fig tree almost completely defoliated as a result of their feeding activities last December.

It may be recalled that in this portion of the Mulgrave mill area a number of fields that were not treated with B.H.C. suffered almost complete crop destruction last year as a result of severe grub attack, and it was only to be expected that the periodical downpours that were experienced throughout last harvesting season would have proved favourable for the ultimate transformation and emergence of vast numbers of these pests.

The second photograph depicts the same tree two and a half months later. By that time all the beetles had died and the tree had recovered sufficiently to produce a full canopy of new foliage.

It seems almost superfluous to add that any fields in the Highleigh area still untreated with B.H.C. are almost certainly doomed to suffer the same fate this year. These growers, therefore, and incidentally others who may have noticed beetles feeding on trees close to their farms, are urged not to be caught again, but to ensure that their fields are fully protected by adequate dressings of this insecticide.

—R.W.M.

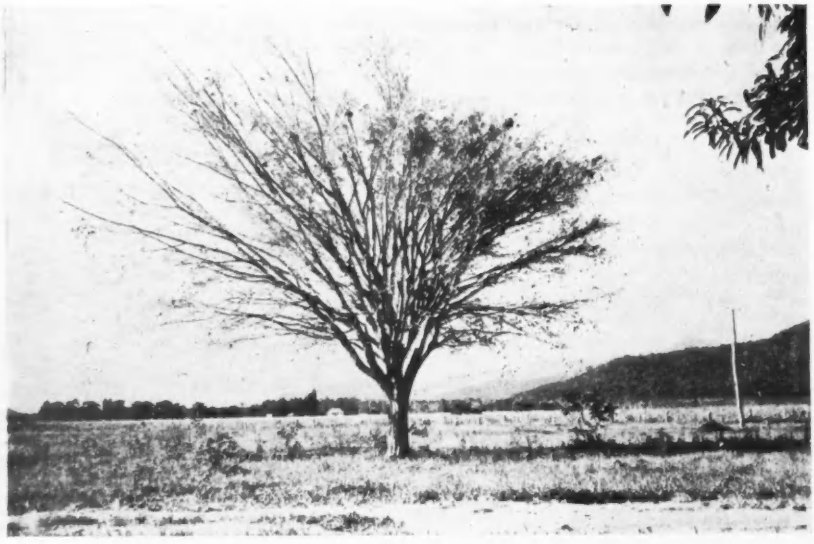


Fig. 11—A weeping fig tree at Highleigh defoliated by cane beetles, December, 1950.

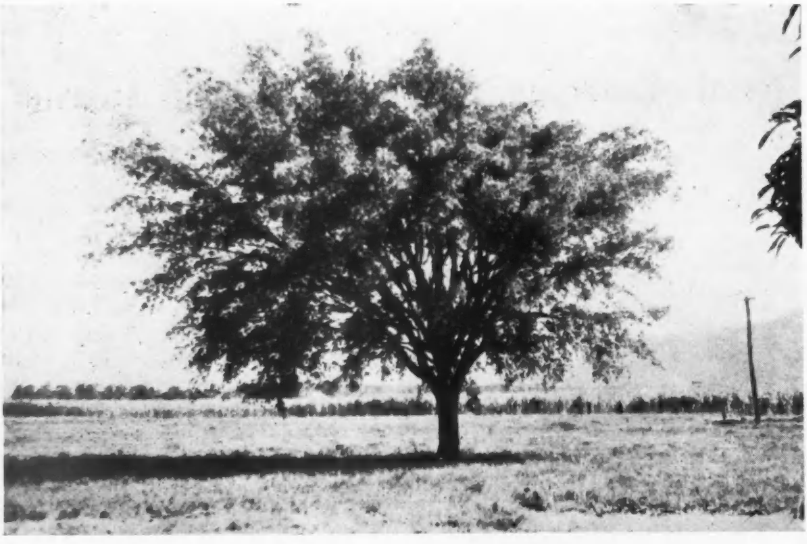


Fig. 12—The same tree, in full leaf, February, 1951.

Note on Varietal Susceptibility to Yellow Spot*

By J. H. BUZACOTT

Within the last two seasons yellow spot disease of sugar cane has suddenly come into prominence in Queensland due largely to its spectacular effect on the variety Trojan. In a recent edition of the "Cane Growers' Quarterly Bulletin," there is a general article on the disease by C. G. Hughes, but since yellow spot has assumed epiphytotic proportions only recently very little information was available regarding varietal susceptibility.

During 1950 yellow spot disease was fairly bad throughout the wetter parts of North Queensland, particularly in the varieties Trojan and Eros. Infection in the 1951 crop is on a much larger scale, probably due to the abnormally wet weather experienced during November and December, 1950, and January, 1951. In common with most other farms in the far North considerable infection is now showing on the Meringa Sugar Experiment Station, and the extensive range of varieties growing there has enabled a unique estimate of relative susceptibility to be made.

Every approved cane variety grown in Queensland is represented at Meringa with the exception of P.O.J.2714, Q.51 and Q.55. The varieties are growing in the wet section of the farm where infection is worst, and susceptibility to yellow spot has been assessed under comparable conditions. It should be pointed out, however, that there are indications that small cane is relatively less susceptible to yellow spot than larger cane so that the degree of infection with yellow spot can be influenced by the fact that even though planted at the same time, some varieties are more advanced when spread of the disease commences and in consequence, age for age, show a greater degree of infection.

A provisional classification of susceptibility for 37 out of 40 approved varieties in Queensland, as well as for Ragnar which is being propagated in the Ingham district, is set out in Table I. The plots examined were necessarily limited in area so the information should be taken only as an *indication* of relative susceptibility. Varieties included under the category of "Slight" include those such as Badila, Cato and Q.44 which seldom show any spotting at all, and also varieties like Pindar and Ragnar which on odd occasions show sufficient spotting to warrant their inclusion in the "Medium" column. However, in such canes the inspection of numerous fields has

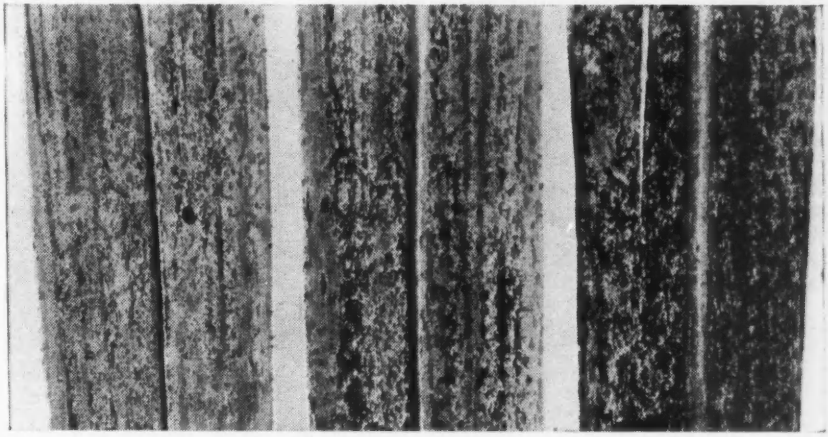


Fig. 13—Yellow spot disease on the leaves of Trojan at Gordonvale during 1950.

* Presented to the 1951 Conference of Cane Pest & Disease Control Boards at Ingham.

led us to believe that these varieties are comparatively resistant to the disease. In the "Medium" column are included varieties which normally show appreciable spotting and under conditions favourable to the disease are badly marked but in which much dead foliage seldom develops. Listed under "Bad" are varieties which appear to be badly marked under most conditions of growth and which in advanced stages of the disease show a good deal of dead foliage. The position of Eros is somewhat problematical. Apart from yellow spot it normally shows death of foliage comparatively early in the year and in diseased blocks how much of this death is due to the disease is hard to estimate. It has provisionally been included in the "Medium" column.

It is as yet unknown whether any primary losses occur from yellow spot. It is very obvious, however, that secondary losses are occurring in badly affected fields due to loss of cover. Early death of lower leaves and resulting poor cover is a feature of the disease in susceptible varieties and even during March the weed growth consequent on the lack of cover is very marked. Not only must this cause losses due to competition for fertilizer but also it will in many instances result in a demand for higher cutting rates.

TABLE I.

Varietal Susceptibility to Yellow Spot.

Meringa, 1951.

Slight	Medium	Bad
Atlas	Clark's Seedling	Co.281
B.208	Comus	Co.301
Badila	M.1900 S.	H.Q.285
Badila Seedling	P.O.J.2878	Q.28
Cato	Q.25	Q.42
Co.290	Q.45	Trojan
C.P.29-116	Q.49	
D.1135	Q.50	
Mahona	S.J.4	
Oramboo	Eros	
Orion		
Pindar		
P.O.J. 213		
P.O.J.2725		
Pompey		
Q.44		
Q.47		
Q.813		
Ragnar		
S.J.2		
S.J.16		
Vesta		

The Germination of Q.50

By NORMAN J. KING

The extension of Q.50 plantings in South Queensland during the past year has been associated with many reports of poor germinations. These experiences were somewhat disturbing because all previous performances of this variety had shown it to be a very reliable striker even when planting conditions were not particularly favourable.

In Mackay, where Q.50 was bred, and where it has rapidly established its position as the major cane of the district, indifferent germinations are almost unknown. Soil conditions in that area are not particularly favourable and the soil tilth at planting time often leaves much to be desired. Despite these drawbacks good germinations almost invariably result. Consequently the South Queensland experiences, where soil conditions at planting are generally good, were all the more puzzling.

A considerable number of enquiries were made in an attempt to clarify the position and it was soon established that planting material was not the reason for the poor strikes. In many cases the same block of plants was used by several farmers who were planting at approximately the same time and some obtained excellent strikes while others experienced indifferent ones. Similarly it was found that the plants were sound, red rot was absent, eyes well advanced and there was no sign of pithiness.

It would appear that conditions of planting were probably the major reasons for the failures. Spring temperatures were rather subnormal and the unseasonal rains possibly had some effect on a variety the germination of which is perhaps more critical than was previously supposed. Canegrowers of South

Queensland will recall that when P.O.J.2878 was first distributed many germination failures were experienced until it became known that its germination temperature was critical, and that it was unsafe to plant it before October or after February.

periences with a newly introduced variety are explainable by the necessity for an acclimatisation period during which the variety settles down. It is possible that, with some varieties at least, such a period is beneficial. The writer recalls very clearly that when C.P.29/116 was

Fig. 14—A nice stand of Q.50 in the Mackay district.

Q.50 is a hardy variety and it has such a high capacity to produce tonnage and to give good sugar content that growers should not be influenced by unfavourable results in one planting season. Within the past ten years or so similar failures have been experienced with other varieties and many will recall that in the early development of Q.47 some strike failures occurred, which were difficult to explain. Some growers consider that such ex-

first grown on the Bundaberg Experiment Station it was hardly worth a second glance, but after a year or two it developed into the valuable cane which we know to-day. It is feasible that Q.50 needs a period of adjustment to local conditions before it can show its best features in South Queensland and growers are advised to persevere with it for a couple of seasons.

Frenchi Cane Grub: Control of the Third Stage in Plant Cane by Means of B.H.C.*

By G. WILSON

The problem of controlling frenchi grubs by applying B.H.C. to the soil during the season when these pests are already present as third stage grubs differs in several ways from that in which the control of the greyback grub is involved. These differences tend to make the task more difficult, and the six most important factors that come up for consideration are as follows:—

Specific Resistance

The frenchi grub is specifically more resistant to B.H.C. than is the greyback: therefore a higher concentration of the insecticide is needed in the treated zone of soil.

Time of Exposure

The third stage frenchi grub is prepared to inflict severe damage on cane roots as soon as

* Presented to the 1951 Conference of Cane Pest & Disease Control Boards at Ingham.

it rises from the subsoil, whereas the greyback grub has a comparatively harmless developmental period of six to eight weeks during which its movements will cause it to pass through the treated zone. Therefore the concentration of B.H.C. must be high enough to bring about a more rapid toxic action on the frenchi pest.

Fig. 15—Frenchi grub damage at Deeral. Cane on both sides was treated with B.H.C.

Placement and Phytotoxicity

When the frenchi grub rises from the subsoil after hibernating, its direct approach towards the cane roots necessitates the B.H.C. being placed in a strategic defensive position close to the roots and at a low level in the soil. This necessity has to be balanced against the possibility of B.H.C. causing extensive root damage if placed so that it obstructs too great a proportion of spreading roots.

Mixed Species

Frenchi and greyback grubs often occur in the same field. Therefore the same application of B.H.C. should, for economic reasons, be able to effect control of both species if possible. Experience has shown that if B.H.C. is applied too deep, e.g., below the plant, greyback control is not satisfactory. Hence the B.H.C. must be placed not lower than just above the plant.

Agronomics

Frenchi damage to young plant cane takes place during the spring and early summer months. This is frequently a period when the soil becomes progressively drier, and any method for applying B.H.C. at that time and thereby preventing damage must be compatible with good farming practices. Under such circumstances these demand that any pruning of the root or any undue disturbance of the soil close to the cane should be avoided. This requirement is quite important because in North Queensland frenchi infestation is associated with areas of relatively low spring rainfall.

Economy

On a number of cane farms frenchi attack is so frequent and devastating that the relatively high cost of heavy applications of B.H.C. would still be profitable, but these cases constitute a small minority when compared with the many on which frenchi attack is uncertain and patchy. On the majority of farms, therefore, the cost of the protection must be limited to what may be regarded as a reasonable cost of insurance against grub damage. In addition the cost of protecting highly susceptible areas must be kept as low as possible. Therefore the protection method must be based on placing a high concentration of insecticide in a position where the most vulnerable parts of the cane stool are protected by applying the B.H.C. in as limited a zone of soil as possible. This must be wide enough to create a high probability of affecting any grub approaching close enough to the base of the stool to do vital damage.

The method of application displaying the optimum compliance with these requirements seemed to be the placing of the B.H.C. in a band 6" to 8" wide just above the cane sett when planting, soil being first introduced into the drill so as to be just level with or very slightly covering the setts. This soil protects the sett roots from being stunted by the B.H.C. as well as supporting the B.H.C. at the lowest level permissible for good greyback control. With variation in soil texture in the same field there may be times when a small portion of the top of some plants are showing, while on other occasions looser soil flows in to cover the plants to a depth of half an inch. The band of B.H.C. is then applied on top of this protective soil and the normal two or four inches of covering soil is placed over the B.H.C.

The band of B.H.C. is so intimately placed in relation to the cane plants that no ordinary process of cultivation with cane cleaners or weeders could remove it without also disturbing many of the plants.

In the trials all these operations were done by hand since they were on a small scale and

in experimental sections, but later a two-row cutter planter was fitted up to do the two separate soil-filling operations, i.e., apply the B.H.C. and deliver fertilizer separately alongside the plant in the usual manner. This machine was used by a farmer to plant 80 acres in an area frequently subject to frenchi attack.

In August, 1950, a field of light red stony schist soil on gently sloping foothill country was selected for a trial using this method of application. The field had been harvested and ploughed out in July and was known to be heavily infested with frenchi grubs that would attack the replant crop. A 10 per cent. B.H.C.-pyrophyllite dust (1.3 per cent. gamma B.H.C.) was applied at rates of 0. 150, 225 and 300 lb. per acre. Severe frenchi damage had taken place in the untreated portions by the first week of November. The 300 lb. treatment gave complete control; the 225 lb. area contained a few affected stools and the 150 lb. treatment gave control estimated to be 80 per cent. as good as the complete control. The last mentioned also allowed the establishment of a satisfactory commercial crop, while the untreated areas are now regarded as unharvestable and a complete loss.

Growth conditions in this trial were harsh, and slow development of roots may have contributed to the lower rates of application not bringing about a sufficiently quick mortality to achieve better results. Another trial was laid out on an old alluvial clayey loam—also a ploughout and August replant field. In this case the experiment embodied a trial involving the mixing of the B.H.C. with fertilizer. Only one rate of application of B.H.C. was employed, equivalent to 75 lb. of 20 per cent. B.H.C. per acre (2.6 gamma B.H.C.). The B.H.C. was in three forms, 20 per cent. and 50 per cent. B.H.C.-pyrophyllite dust and a 100 per cent. B.H.C. in the shape of minute pellets. The grain size of this last-mentioned product was to the naked eye, small enough to resemble the texture of super-phosphate. Frenchi damage became obvious in the untreated areas by the first of December. Excellent control, apparently complete, was achieved by all three forms of B.H.C. The mixing of the B.H.C. with fertilizer as was done here is not recommended for reasons given in another publication.

These trials are still in the plant crop stage and relative yields will not be available until they are harvested.

Fig. 16—Frenchi grub damage in foreground. Cane at rear received B.H.C. at the rate of 150 lb. per acre of 10 per cent. dust.

Certain disadvantages are associated with the application of B.H.C. in the drill at planting time. These are:—

1. The expenditure on B.H.C. is made before a good germination is assured. Poor germination which could be caused by poor plants, pineapple disease, poor soil conditions, etc., would necessitate heavy supplying which would result in much of the B.H.C. being displaced from its strategic position.
2. Unless the method of application described is adhered to there is the danger of a grower surrounding his cane sett roots with B.H.C. to the detriment of the germination and growth of the cane.

Control of frenchi is much more likely to be required in the young stages than in the third stage and this, along with greyback grub control, can be effected by the more usual method of applying B.H.C. in the half open drill after the cane is established. Until such time as further experience may show the desirability of changes in method, cane growers are recommended to adhere to this more usual method except in circumstances where third stage frenchi are important.

The progress of B.H.C. in grub control from the Bureau's first experiments to the present widespread field applications has been phenomenally rapid and successful. Refinements in field technique and a more intimate knowledge of some of the factors involved still require a large volume of experimental work for their clarification. Recommendations to cane growers are based on present knowledge and represent an attempt to meet their immediate needs. It is advisable to adhere to field methods which show the least possible risk of breakdown through faulty manipulation as long as these meet the immediate requirements of pest control.

The Increasing Importance of New Cane Varieties to Our Industry*

By NORMAN J. KING

In most sugar producing countries of the world, whether beet or cane, the sugar industries are following a vigorous programme of varietal improvement either by variety introduction or by local breeding. Much of the increasing world cane sugar production is due to varietal improvement as distinct from expansion of area. Queensland is well to the fore in this movement and can show results over the past 20 years which are possibly second to none. Queensland's progress in sugar production during that period is exemplified in the following figures:—

Tonnage cane	Tonnage sugar	Cane per ac.	Sugar per ac.
Average of 4 years 1928-1931—			
3,720,134	534,299	16.79	2.41
Average of 4 years 1947-1950—			
5,950,641	817,243	22.84	3.15
(1950 figures estimated)			

The years 1928-1931 were all good years with production at record or near record heights. The second period 1947-1950, includes three very good years and one of below average production. The improvement which took place between these two periods is startling, even allowing for the fact that there was a 14 per cent. increase in acreage harvested. To what is this increase due? We may list the probable contributory factors as (1) varieties, (2) better fertilization, (3) improved cultural practices and (4) pest and disease control.

Of these the influence of varieties undoubtedly outweighs any of the others when considering the State as a whole. Pest control with benzene hexachloride admittedly played a large and very important part in crop improvement in the far north, but the effect of varieties in Ingham, the Burdekin, Mackay and Bundaberg was the major factor in raising

* Address delivered to the Annual Conferences of the Australian Sugar Producers' Association and the Queensland Cane Growers' Association in March, 1951.

State production. During the same two periods—20 years apart—Mackay production per acre rose from 12.15 to 19.46 tons, while Bundaberg district figures increased from 13.47 to 25.00 tons per acre. An outstanding example of varietal effect on district production is given by the Isis district. In 1933, one of the two mills in the area closed down because either mill had difficulty in obtaining more than 60 or 70 thousand tons of cane from its assigned area. In recent years the remaining mill obtains 250,000 tons or more from approximately the same assigned acreage. The improvement in this case is very largely by virtue of improved varieties, although better fertilization has undoubtedly played an important part.

Similar examples may be cited from other districts of the State and it may be claimed with some justification that still further improvements in production will take place. The varietal changes to date are most marked in the central and southern regions but in the north, Badila is still a major variety and can conceivably be replaced in the future by a more productive cane.

In South Queensland, although the varietal revolution is complete since 1930, the picture can be entirely altered in the next decade by further introductions.

North Queensland growers do not appreciate to the full the major varietal improvements which have taken place in other districts and may perhaps gauge the varietal problem by using Badila as their yardstick. Herbert River growers do, however, know what new canes have done for their area and there is no valid reason to believe that Badila will not recede from favour in the same way in areas from Tully north.

Badila has been a good friend to the far northern producers but it is not unbeatable. The production of the Mossman to Ingham districts for the past four years 1946-1949 has averaged only 21.17 tons per acre and this is not a figure regarding which northern growers should be proud or complacent. Over the same period it has been beaten by the Bundaberg-Isis district and by the Nambour-Beenleigh districts where, contrary to popular belief, the proportion of two-year cane is small. It is the firm belief of northern producers that the north is the only place to grow cane, but the figures of production do not support that argument.

Varietal improvement can and will be made in the far north. Apart from our own cane breeding and that of the C.S.R. Co., other avenues of improvement are being constantly explored. During the past two years we have imported from abroad, 40 promising varieties. These include the two best P.O.J. canes raised at the Java Experiment Station, the best Hawaiian production, a variety which constitutes half the Formosan production, a Barbados seedling which produces 90 per cent. of the crop of that country as well as a selection of the best types from South Africa, India, Louisiana and Argentine. These are all commercial types and it is possible that some may be suitable for tropical Queensland conditions.

In addition, as previously announced, a search of New Guinea will be made shortly to provide commercial and breeding canes for our industry.

The extension of cane growing into marginal lands as the result of industry expansion brings further varietal problems into being. On such lands the standard varieties of the district may not be suitable and it will be incumbent on the cane breeders to evolve hardier types. The success of many of these new lands will depend on the varieties grown and new settlers will not be justified in expecting that they will farm their lands successfully with existing canes. The increasing importance of varieties is also closely allied to the necessity for types with higher early sugar so that the early part of the season may be rendered less uneconomic to producers.

Louisiana is already selecting and rejecting new seedling canes in accordance with their suitability for mechanical harvesting and it may not be too long before we have to face the same problem here.

An Outline of Disease Control in the Mulgrave Area*

By P. VOLP.

Sugar cane diseases whether of bacterial, fungal or virus origin are too often regarded lightly by cane growers. The Sugar Experiment Stations Acts have conferred wide powers on the Bureau of Sugar Experiment Stations and Cane Pest and Disease Control Boards, which may be implemented in the control of disease outbreaks. In the event of a major disease such as downy mildew or gumming becoming established in an area, the complete elimination from the district of any susceptible variety may be ordered. Such drastic action may cause a severe loss not only to individual growers but also to the whole district concerned. In the past it has been necessary to take this action in a number of districts throughout Queensland. One of the functions of a Cane Pest and Disease Control Board is to take requisite steps for the suppression of cane diseases, and it should also be the object of each Board to prevent the build-up of any diseases in its mill area, thereby rendering it unnecessary to institute rigid control measures that might cause hardship amongst the growers concerned. These notes have been compiled to indicate the disease problems which have been encountered by the writer in his capacity as Supervisor of the Mulgrave Cane Pest and Disease Control Board during the past eleven years.

The major diseases with which the Mulgrave area has had to contend have been gumming, downy mildew, leaf scald, and chlorotic streak, whilst top rot, mosaic and pokkah boeng remained of minor importance. In the past year a new disease to the district (yellow spot) has appeared, and there is some indication that it may be causing appreciable losses.

Gumming

An outbreak of gumming occurred in 1934. Control was effected by the prohibition of the planting of S.J.4 and Clark's Seedling, the former being at the time one of the promising varieties of the district. The elimination of such valuable varieties caused hardship at the time because, owing to the outbreak of war in 1939, fertilizer became scarce, and the resistant varieties supplied to take the place of those removed from the approved list were of a comparatively poor standard; consequently, for a time production suffered. At the present time resistant varieties capable of good yields are available, and accordingly such a prohibition involving one or two varieties would not now cause the same hardship. The idea, still cherished by some growers, that the varieties S.J.4 and Clark's Seedlings are the best which have been introduced may be shaken in the near future. Clark's Seedling is already again on the planting list whilst S.J.4 has been reintroduced to the area, and provided no fresh outbreak of gum occurs it will no doubt in due course again become approved. During the course of the gumming disease campaign two of the principal difficulties were the elimination of volunteer stools of susceptible varieties, and the use of planting material in which odd stools of the prohibited varieties occurred. After a number of years, however, the prohibited susceptible varieties were got rid of and this has resulted in the apparent elimination of gumming disease from the area.

Downy Mildew

This disease was firmly established in the area when the writer commenced duties as Supervisor in 1939. An area survey showed that it was established on some 15 farms in three sections of the Mulgrave district and that the varieties P.O.J.2878, B.147, D.1135 and Q.2 were mainly affected. Constant rogueing at four-day to daily intervals was undertaken from November to March/April, or until such time as lodging or the effects of grub attack made further inspection impossible. Besides rogueing, the introduction of clean seed and the planting of resistant varieties played a big part in the elimination of the disease. Maize was found to be highly susceptible and, as this plant was used extensively for fodder purposes, particular attention was paid to maize fields. In the event of these

* Presented to the 1951 Conference of Cane Pest & Disease Control Boards at Ingham.

fields becoming infected, plough-out orders were instituted. The present-day major variety Trojan, though resistant to gumming, is susceptible to downy mildew; thus in the control of this disease constant inspections are the key-note to success.

Leaf Scald

With the control of both gumming and downy mildew, leaf scald assumed the role of the most serious disease in the Mulgrave area. This bacterial disease is mainly confined to the wetter section of the area. In this section all susceptible, tolerant, and even moderately resistant varieties become infected, and in some instances to an alarming extent. In susceptibie varieties heavy losses often occur; in the case of tolerant varieties the disease generally causes little loss but at times may cause serious loss should adverse climatic conditions supervene. On farms liable to heavy leaf scald infection the only means of restricting losses to a minimum is by the *continued introduction of clean seed*. Resistant varieties can, of course, be used but their inferior agricultural qualities in many instances render the introduction of clean seed a more profitable venture. Prior to the acute shortage of field labour in the industry the annual introduction of clean seed was extensively practised, but over the last few years it has been impracticable to procure sufficient cane for all plantings. The variety Trojan, which is susceptible yet tolerant to leaf-scald, is causing considerable worry in spreading the disease. When grown under good conditions the disease often remains masked and only shows up in the ratoons. If plants from such a source are planted and harsh growth conditions prevail after planting the resulting crops may show as much as a 50 per cent. loss. In young plant cane of this variety leaf scald is recognisable by the white creamy shoots. These shoots have been noted in some fields after germination. but on subsequent inspections some months later after better growth conditions, no symptoms of the disease may be discernible. Under such conditions, if an early inspection had not been made the field could have been passed as free of disease.

Experience has shown that, in the case of Trojan, it is possible for leaf scald symptoms to be noted in the young primary shoots, but no further symptoms may appear until the crop is harvested and the young ratoon shoots come away. Other instances have been noted where no symptoms have shown in the early ratoon stage, but have developed later. When inspecting stands of matured Trojan for disease or crops on farms where no previous outbreaks have been recorded the writer has found it expedient to concentrate on the sections which show the poorest growth, e.g., the tops of ridges. Good growing conditions tend to mask the disease. On the other hand in other varieties such as H.Q.426, Q.44, S.J.4, Badila and Badila Seedling evidence of leaf scald can be readily found in the field under most conditions of growth.

Chlorotic Streak

In the Mulgrave district chlorotic streak disease has a similar distribution to leaf scald in that it is mainly conned to the wet sections of the area. During the past few years the principal damage from it has been confined to Badila and Trojan. Prior to the programme of clean seed introduction to the affected areas for the control of gumming disease which incidentally is also the chief method used for combating chlorotic streak, this disease was responsible for heavy losses in Badila. It has been found that there is very little spread of the disease on the higher well-drained lands. and consequently these areas are drawn upon for planting material for the wetter portions of the district. In these wetter sections the plant cane does not readily die from chlorotic streak but often is somewhat checked in growth whilst mortality occurs in the affected stools in the resultant ratoon crop leaving large gaps over the field. Instances in this area have been noted where as high as 70 per cent. of a Badila field has failed to ratoon.

Red Stripe

This disease and the more advanced stage known as top rot is associated with years when weather conditions favour uneven growth rate. Early planting and fertilizing is the method recommended for minimising losses. Numerous instances have been noted wherein the plant crop has suffered heavy losses from top rot but the resulting ratoons have showed no symptoms of the disease.

Mosaic

The Mulgrave area has never been greatly troubled with mosaic disease and probably no

more than 20 stools have been rogued on its account. As a precaution, however, no plants have been taken from a field in which even one stool of mosaic was found.

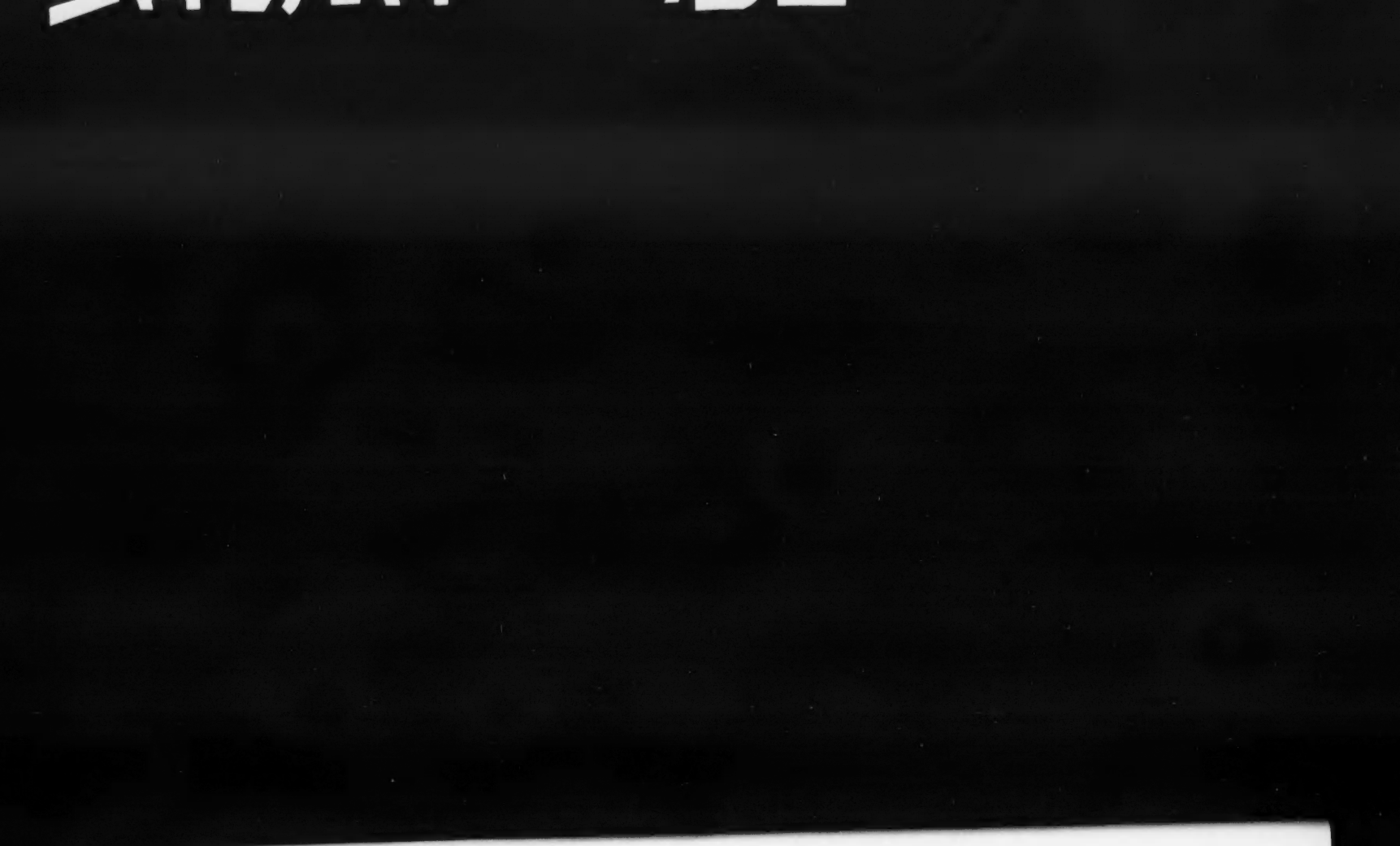
Yellow Spot

This disease, not previously recorded in the district, made its appearance in 1950, attacking Trojan to a marked degree in the wetter sections of the area. Eros appeared to be even more susceptible than Trojan, but there is little of this variety grown in the area. Yellow spot was also seen in Pindar, P.O.J.2878 and Q.50, but to a lesser degree than Trojan. It has not been determined whether the disease is responsible for commercial losses here but it seems possible that these may occur in 1951 as with the incessant wet weather it has become evident much earlier this year. Even now (early February) many fields are badly yellowed. A field to field inspection is being undertaken at the time of writing in order to determine as far as possible the range and intensity of the disease.

Although other diseases than those abovementioned do occur, none has so far warranted close attention, although banded sclerotial disease is being carefully watched since it seems to attack both Pindar and Trojan more seriously than any of the older varieties. It is always possible that other of the so-called minor diseases may eventually become more important, but by maintaining close inspections of the fields each year any outbreaks can be checked at an early stage. With the constantly changing varietal scene and the attendant changes in disease reactions the above control methods entail close scrutiny on the part of supervisors and intimate co-operation with the mill staff, but the results are worthwhile and the work well justified.

Bureau Expedition to New Guinea

On April 17th, 1950, Messrs. J. H. Buzacott and C. G. Hughes departed from Cairns by air for New Guinea. This departure was the culmination of plans made during the previous six months for a search of portions of the Territory of Papua and New Guinea. Although several previous parties (dating back to 1896) have traversed certain sections of New Guinea, the potentialities of that vast island, insofar as they relate to native canes, have barely been scratched. For this reason a fair degree of optimism exists regarding the outcome of the present expedition.

Already we have received 120 varieties of noble and wild canes collected by Messrs. Buzacott and Hughes, these having been despatched by air as soon as collected. All precautions have been taken to ensure that selected varieties are free from disease and pest infestation, but as an added precaution they are further treated on arrival in Brisbane and are planted in quarantine where they will remain for twelve months.

—N.J.K.